

Appl. No.
Filed

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reaction between titanium and silicon is the junction area is reduced. Thus, Applicant respectfully submits that independent claims 1 and 10 are patentable over the cited prior art reference.

Attached hereto is a marked-up version of the changes made to the application by the current amendment. The attached page is captioned "**Version with Markings to Show Changes Made**"; additions are shown as underlined and deletions are shown [bracketed].

SUMMARY

For the foregoing reasons, Applicant submits that independent claims 1 and 10 are allowable over the art of record. Applicant further submits that the remaining claims also define additional patentable subject matter and are further allowable due to their respective dependencies upon the above-identified independent claims. Applicant therefore submits that the application is now in condition for immediate allowance and requests the prompt allowance of the same. Should there be any impediment to the prompt allowance of this application that could be resolved by a telephone conference, the Examiner is respectfully requested to call the undersigned at the number shown below. Please charge any additional fees, including any fees for additional extension of time, or credit overpayment to Deposit Account No. 11-1410.

Respectfully submitted,

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Dated: 1/6/2003

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Version with Markings to Show Changes Made

1. (Amended) An integrated circuit, comprising:
 - a silicon substrate;
 - an insulating layer formed on an upper surface of the substrate wherein a contact opening is formed in the insulating layer, wherein the contact opening extends from an upper surface of the insulating layer to the upper surface of the substrate;
 - a conductive contact deposited in the opening in a manner such that the conductive contact directly contacts the upper surface of the substrate, wherein the conductive contact comprises a titanium layer interspersed with titanium silicide, wherein a substantial portion of the titanium silicide is interspersed in the titanium prior to depositing in the opening;
 - a conductive contact fill deposited on an upper surface of the conductive contact in a manner such that the contact fill fills substantially the entire contact opening, wherein the contact fill comprises titanium nitride.
10. (Amended) A contact structure having a contact opening formed over a junction region in a silicon substrate, comprising:
 - a conductive contact layer comprising titanium interspersed with titanium silicide, wherein the conductive contact layer is deposited directly on an upper surface of the silicon substrate over the junction region, wherein a substantial portion of the titanium silicide is interspersed in the titanium before the conductive contact layer is deposited on the upper surface of the silicon substrate over the junction region, wherein the titanium silicide in the conductive contact layer reduces consumption of silicon from the junction region during a silicidation reaction between silicon in the substrate and titanium in the conductive contact layer;
 - a diffusion barrier layer formed on an upper surface of the conductive contact layer;
 - a contact fill formed on an upper surface of the diffusion barrier layer, wherein the contact fill comprises titanium nitride, wherein the titanium nitride fills substantially the entire contact opening.